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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.            | CONFIRMATION NO.       |
|---|-------------|----------------------|--------------------------------|------------------------|
| 10/564,715  | 01/13/2006  | Dominic J. Heuscher  | PHUSO30234US                   | 1591                   |
| 38107 7590 06/20/2007<br>PHILIPS INTELLECTUAL PROPERTY & STANDARDS<br>595 MINER ROAD<br>CLEVELAND, OH 44143 |             |                      | EXAMINER<br>COCHRAN, ANTHONY K |                        |
|   |             |                      | ART UNIT<br>2882               | PAPER NUMBER           |
|   |             |                      | MAIL DATE<br>06/20/2007        | DELIVERY MODE<br>PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |   |  |
|------------------------------|--------------------------------------|---|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/564,715 | <b>Applicant(s)</b><br>HEUSCHER, DOMINIC J. |  |
|                              | <b>Examiner</b><br>Anthony Cochran   | <b>Art Unit</b><br>2882                     |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 26-31 is/are allowed.
- 6) ☐ Claim(s) 1, 2, 5-14, 16, 18-20, 22, 25, and 32-33 is/are rejected.
- 7) ☐ Claim(s) 3, 4, 15, 17, 21, 23 and 24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 January 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **Detailed Action**

#### ***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, with respect to claims 6 and 8, the first and second radiation detectors spanning greater than 90 degree around a gantry must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

**Claim Rejections - 35 USC § 112**

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 5, 11, and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites that angular spacing of the detector to the source defines both symmetric and asymmetric beam components with the symmetric component centered on the rotational center. This recitation is vague and indefinite insofar as it is unclear how it is possible to have both symmetric and asymmetric beam components.

The Examiner has examined the claims as best understood as follows.

Claim 11, line 3 and claim 33, line 14 recite the limitation "the conebeam".

There is insufficient antecedent basis for this limitation in the claim.

**Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinno et al. (US 7085343 B2) in view of and Mori et al. (US Patent 5,311,428).

With respect to claims 1 and 18 Shinno et al. discloses:

a rotating gantry (3001) that rotates about an examination region along a longitudinal axis (RA);

a first radiation source (3111) disposed on the rotating gantry and arranged to emit first radiation into the examination region;

a second radiation source (3121) disposed on the rotating gantry and arranged to emit second radiation into the examination region, the second radiation source being angularly spaced around the gantry from the first radiation source (see fig. 3);

a first asymmetrically adjustable collimator (3111) that is asymmetrically adjustable in a direction generally perpendicular to the longitudinal axis (RA) to position a first outer x-ray projection of the first radiation relative to a second outer x-ray projection of the first radiation (col 18, lines 45-49);

a second asymmetrically adjustable collimator (3121) that is asymmetrically adjustable in a direction generally perpendicular to the longitudinal axis (RA) to position a first x-ray outer projection of the second radiation relative to a second outer x-ray projection of the second radiation (col 18, lines 54-59),

a first radiation detector (3113) are arranged to receive the first radiation,

a second radiation detector (3123) arranged to receive the second radiation, and

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a reconstruction processor (3024) that reconstructs projection data acquired during gantry rotation by the first and second radiation detectors into one or more image representations.

Shinno et al. fails to disclose that the center of the first and second radiation detectors are angularly spaced around the gantry from the first and second radiation sources by less than  $180^\circ$ , respectively.

Mori et al. discloses shift mechanisms (30-1 and 30-2, see fig. 1) for the multichannel detectors that adjust the detectors to angular spacings of less than  $180^\circ$  around the gantry.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the system of Shinno et al. to include the shift mechanisms of Mori et al., since a person would have been motivated to adjust the data sampling pitch (col 1, lines 64-68) and produce an image of higher resolution as stated by Mori et al. ( col 1, lines 38-42).

Claims 2, 7, 9, and 10-11, 19-20, 22, 25, and 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinno et al. and Mori as applied to claim 1 above, and further in view of Karellas et al. (US Patent 6895077 B2).

With respect to claims 2, 19, 20, 22, and 25, Shinno et al. and Mori discloses the computed tomography imaging system as set forth in claim 1 above.

Shinno et al. and Mori fail to disclose a first radiation detector that includes a high resolution portion having detector elements of a first size; and a low resolution portion

having detector elements of a second size, the second size being larger than the first size.

Karellas et al. discloses a radiation detector that includes a high-resolution portion having detector elements of a first size; and a low-resolution portion having detector elements of a second size, the second size being larger than the first size. (figs. 10A - 10H).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the system of Shinno et al. and Mori to include a first radiation detector arrangement having a high resolution portion with detector elements of a first size, and a low resolution portion with detector elements of a second size as suggested by Karellas et al., since a person would have been motivated to achieve higher spatial resolution in the central section as stated by Karellas et al.

With respect to claim 7, Shinno et al. discloses that the second radiation source is angularly spaced from the first radiation source by 90 degrees (fig. 8).

With respect to claim 9, Shinno et al. discloses that the first and second radiation sources lie in a plane parallel to a plane of gantry rotation (col 8, line 54).

With respect to claim 10-11 and 32-33, Shinno et al. discloses the system of claim 1 above, and that the first and second radiation sources are offset in the axial direction (col 8, lines 55-59, the z position of the second system is shifted from the z position of the first detection system).

Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinno et al. and Mori as applied to claim 1 above, and further in view of Crawford et al. (US Patent US 4636952 A).

With respect to claims 6 and 8, Shinno et al. and Mori disclose the computed tomography imaging system as set forth in claim 1. Shino et al. discloses that a second radiation source is angularly spaced from the first radiation source by 90 degrees (fig 18).

Shinno et al. and Mori fail to disclose wherein the first and second radiation detectors each span greater than 90 degrees around the gantry.

Crawford et al. teaches a radiation detector spanning greater than 90 degrees (fig. 4 below).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the system of Shinno et al. and Mori such that the first and second detectors span greater than 90 degrees as suggested by Crawford et al., since a person would have been motivated to provide a means for imaging larger objects.

Claims 10-13 and 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinno et al. and Mori as applied to claim 1 above, and further in view of Malamud (US 6760399 B2).

With respect to claims 10-13 and 32-33, Shinno et al. and Mori disclose the system of claim 1 above, where the system further includes a support element (1031) for supporting an associated imaging subject in the examination region, with the support



element being linearly movable in an axial direction (col 8, lines 22-25), and that there is simultaneous gantry rotation and axial motion of the support element effecting a helical orbit of the first and second radiation sources relative to the associated imaging subject during acquisition of the projection data (col 8, lines 55-59).

Shinno et al. and Mori fail to disclose that the first and second radiation sources are conebeam radiation sources offset in the axial direction, and that the first and second radiation detectors are two dimensional arrays.

Malamud discloses conebeam sources (claim 1) offset in the axial direction (claim 10) and two-dimensional detector arrays (claim 1, line 9).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Shinno et al. and Mori to include offset conebeam sources and 2D detector arrays as suggested by Malamud, since a person would have been motivated to have large area of coverage, high quality time-coherent CT scans, minimize potential cone-beam artifacts, as stated by Malamud (col 2, lines 1-5).

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shinno et al. and Mori as applied to claim 1 above, and further in view of Such et al. (US 20010011701 A1).

With respect to claim 14, Shinno et al. and Mori disclose the system of claim 1 above.

Shinno et al. and Mori fail to disclose that the first and second radiation detectors include an anti scatter grids.

Such et al. discloses an anti-scatter grid (abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the detectors in the system of Shinno et al. and Mori to include anti-scatter grids as suggested by Malamud, since a person would have been motivated to reduce artifacts caused by scattered x-rays.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shinno et al. and Mori as applied to claim 1 above, and further in view of Hanover et al. (US 6104780 A).

With respect to claim 16, Shinno et al. and Mori disclose the system of claim 1 above.

Shinno et al. and Mori fail to disclose a radiation source control that alternates between generating radiation by a first radiation source (140) and generating radiation by a second radiation source (142) such that the first and second radiation sources are not simultaneously generating radiation.

Hanover et al. discloses a radiation source control (200) that alternates between generating radiation by a first radiation source (140) and generating radiation by a second radiation source (142) such that the first and second radiation sources are not simultaneously generating radiation (col 9, claim 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Shinno et al. and Mori to include a means for alternating activating the sources such that they are not simultaneously generating radiation as suggested by Hanover et al., since a person would have been motivated to

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display an image from a first system while operating the second as stated by Hanover et al. (abstract).

***Allowable Subject Matter***

Claim 5 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 3-4, 15, 21, 17 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 26-31 are allowed.

The following is a statement of reasons for the indication of allowable subject matter.

Regarding claims 3-4, 21, and 24, the prior art does not disclose or fairly suggest a dual source, dual detector, multi-resolution detector system with high and low resolution detector elements, where the high resolution portions of each detector are arranged between the low resolution portions in combination with all the limitations in each respective claim and respective base claim.

Regarding claims 26-30, the prior art does not disclose or fairly suggest a computed tomography imaging method where the reconstruction includes combining 90° contiguous angular segments of central projections and 180° contiguous angular

segments of the central and surrounding projections during voxel reconstruction in combination with all the limitations in each respective claim and respective base claim.

Regarding claims 17 and 31 the prior art does not disclose or fairly suggest a computed tomography imaging method where the reconstruction includes weighting voxels in a transition region and applying a different weighting to voxels in the central and surrounding regions.

### ***Response to Arguments***

Applicant's arguments filed 03/12/2007 with respect to the claim objections have been fully considered and are persuasive. The objections to claims have been withdrawn.

Applicant's arguments filed 03/12/2007 with respect to the specification have been fully considered and are persuasive. The objection to the specification has been withdrawn.

Applicant's arguments filed 03/12/2007 with respect to the rejection of claim 31 under 35 U.S.C. 101 have been fully considered and are persuasive. The objection to the specification has been withdrawn.

Applicant's arguments with respect to claims 1-33 have been considered but are moot in view of the new ground of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Cochran whose telephone number is (571) 272-9794. The examiner can normally be reached on Monday - Friday from 8:00am to 5:00pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick, can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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SUPERVISORY PATENT EXAMINER